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ASSIGNMENT BOOKLET

SCN2231 Biology 20
Module 1 Assignment

FOR STUDENT USE ONLY

Date Assignment Submitted: ____________________

Time Spent on Assignment: ____________________

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Student File Number: ____________________

Module Number: ____________

FOR OFFICE USE ONLY

Assigned Teacher: ____________

Assignment Grading: ____________

Graded by: ____________

Date Assignment Received:

Student's Questions and Comments

Apply Module Label Here

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Please verify that preprinted label is for correct course and module.

Teacher's Comments

____

Teacher

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- Are all the assignments completed? If not, explain why.
- Has your work been reread to ensure accuracy in spelling and details?
- Is the booklet cover filled out and the correct module label attached?

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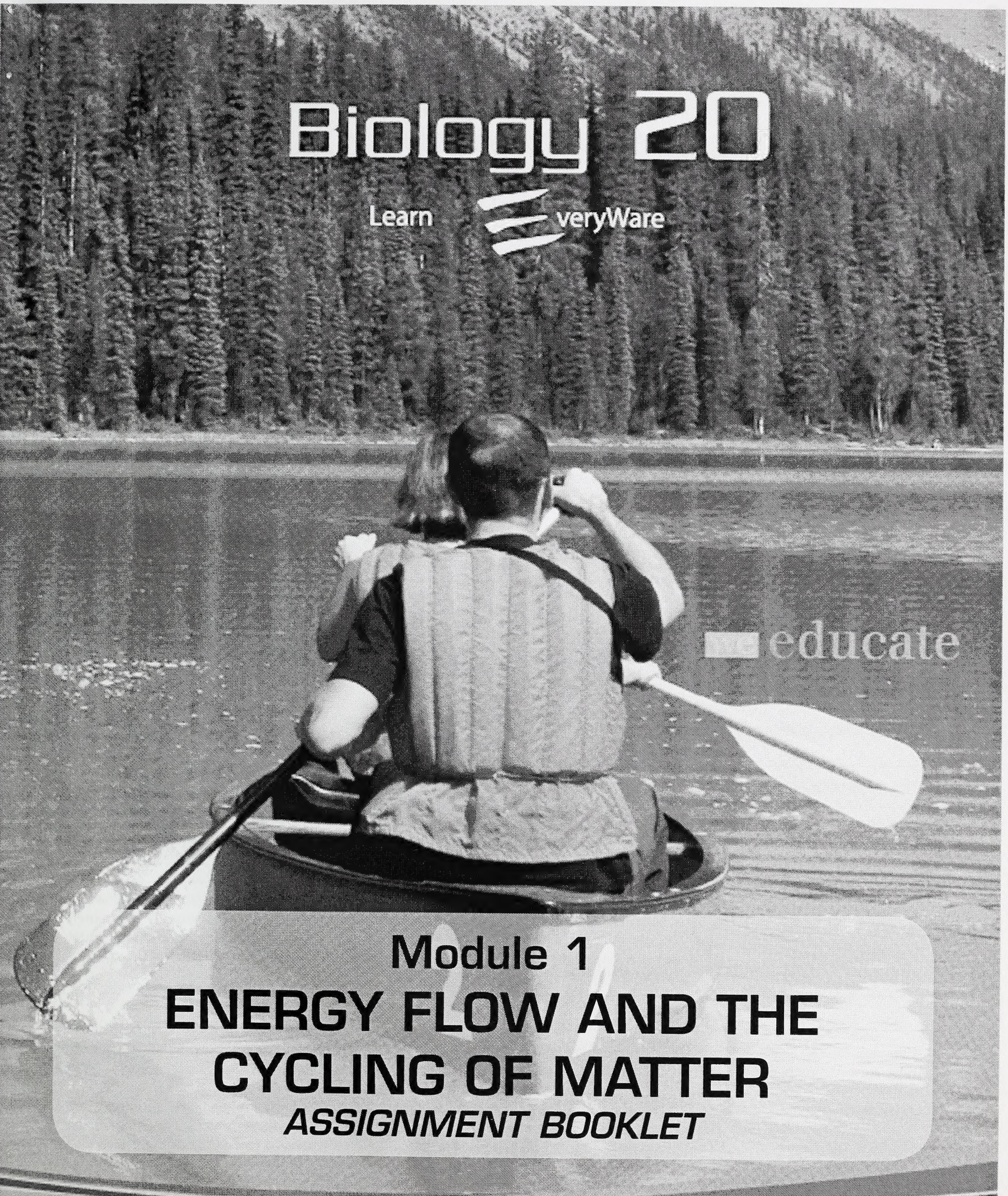

Biology 20

Learn EveryWare

educate

Module 1

ENERGY FLOW AND THE CYCLING OF MATTER

ASSIGNMENT BOOKLET

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	50	
Lesson 2 Assignment	56	
Lesson 3 Assignment	42	
Lesson 4 Assignment	45	
Lesson 5 Assignment	25	

Teacher's Comments

Biology 20
Module 1: Energy Flow and the Cycling of Matter
Assignment Booklet
ISBN 978-0-7741-3021-9

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Students	✓
Teachers	✓
Administrators	
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Other	

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MODULE 1: LESSON 1 ASSIGNMENT

This Module 1: Lesson 1 Assignment is worth 50 marks. The value of each assignment and each question is stated in the left margin.

(50 marks) Lesson 1 Assignment: Energy for Life

(40 marks) Part A: Photosynthesis Lab Report

Problem (Purpose of the Lab)

- Which conditions produce the best rate of photosynthesis?
- How do limiting factors affect the rate of photosynthesis?

Hypothesis

Materials

- Photosynthesis Lab Gizmo
- Exploration Guide

Procedure

See the Exploration Guide link within the Photosynthesis Lab Gizmo.

Observations

Photosynthesis and Light Intensity

(1 mark) 1. a. What is the rate of oxygen production?

(2 marks) b. What does this tell you about the rate of photosynthesis when no light is present? Explain your answer.

(2 marks) 2. a. What happens to the rate of oxygen production as the light intensity increases?

(2 marks) b. What does this tell you about the rate of photosynthesis as the light intensity increases?

(3 marks) c. Does increasing light intensity always have the same effect on oxygen production? In other words, are there certain light intensity changes that have no effect at all? Describe what you see.

Photosynthesis and Carbon Dioxide Level

(1 mark) 1. What is the rate of oxygen production when there is no carbon dioxide available?

(1 mark) 2. a. What happens to the rate of oxygen production as the CO_2 level increases?

(2 marks) b. What happens when the CO_2 level exceeds 3%?

Photosynthesis and Temperature

(1 mark) 1. a. What is the oxygen production when the water temperature is 0.0°C?

(2 marks) b. What does this tell you about the rate of photosynthesis when the temperature is 0.0°C?

(1 mark) 2. a. What happens to the rate of oxygen production as the temperature is increased?

(2 marks) b. What happens to the rate of oxygen production when the temperature exceeds 25ºC?

Photosynthesis and Colour

(1 mark) 1. What happens to the rate of oxygen production as you change the wavelength of the light?

(2 marks) 2. a. Which two colours and wavelengths resulted in the highest rates of photosynthesis?

(2 marks) b. Which colour and wavelength led to the lowest rate of photosynthesis?

(3 marks) c. How do your observations explain why plants appear green? (**Hint:** Remember that objects are a certain colour because they reflect that colour of light.)

(1 mark per graph)

Graph

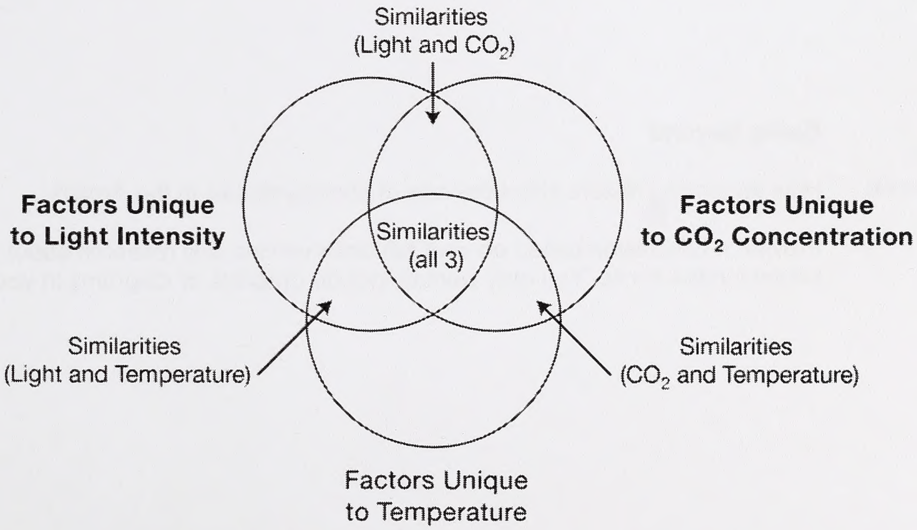
You can take screen captures of the graphs from the Photosynthesis Lab Gizmo and insert them under the appropriate headings. You may also recreate your own graphs using a spreadsheet program.

Oxygen Production vs. Light Intensity

Oxygen Production vs. CO_2 Concentration

Oxygen Production vs. Temperature

Using a Venn diagram may be a good way for you to compare the above graphs. This illustration shows you how to set up a Venn diagram. You may want to use this method to answer the questions that follow.



Questions

(2 marks)
- How are the graphs similar?

(2 marks)
- How are they different?

Conclusions

(3 marks) Make a statement based on your observations about the optimal conditions for photosynthesis in green plants.

Going Beyond

(2 marks) How do limiting factors affect the rate of photosynthesis in the Arctic?

Provide a conclusion based on your lab observations and research about conditions present in the Arctic. You may want to include graphics or diagrams in your response.

(10 marks)

Try This

Choose TWO of these to complete. Each question you choose is worth 5 marks.

TR 1. What series of hypotheses and observations led scientists to the conclusion that carbon dioxide and oxygen were involved in what is now known as photosynthesis?

TR 2. The discovery of deep-sea organisms using chemosynthesis is listed by the scientists in the "Quirks and Quarks" episode as one of the top three discoveries in science. What is significant about chemosynthesis that allows it to open other avenues of theory?

TR 3. How did the discovery of microbes in geothermal vents lead to the possibility of new technology?

TR 4. What other hypotheses have been formed due to the discovery of these chemosynthetic organisms?

TR 5. About 2% of solar energy is for photosynthesis. Where’s the other 98%? Explain where the other 98% of solar energy goes. Predict what would happen if there were fluctuations (an increase or a decrease) in these percentages? Also predict what might cause these changes. “Figure 1.4” on page 11 in textbook may be helpful.

(5 marks) **TR__:**

(5 marks) TR__:

MODULE 1: LESSON 2 ASSIGNMENT

This Module 1: Lesson 2 Assignment is worth 56 marks. The value of each assignment and each question is stated in the left margin.

(56 marks)

Lesson 2 Assignment: Energy Flow Through Trophic Levels and the Cycling of Matter

(8 marks) Choose ONE of the following two Try This activities to complete.

TR 2. Thought Lab 1.1: Analyzing Energy Transfers

Complete Analysis questions 2, 3, and 4 on page 20 of the textbook. You will be choosing one of the "Thought Labs" to hand in to your instructor.

(2 marks) 2.

(2 marks) 3.

(4 marks) 4.

OR

TR 3. Thought Lab 1.2: Energy Fluctuation in an Ecosystem

Complete Analysis questions 1 to 4 on page 25 of your textbook. You will be choosing one of the Thought Labs to hand in to your instructor.

(1 mark) 1.

(1 mark) 2.

(2 marks) 3.

(4 marks) 4.

(6 marks)

TR 4. Calculating Energy Transfer

Answer question 10 on page 27 of your textbook. Be sure to answer all parts of the question, and clearly show your calculations. Be sure to use significant digits when possible.

10.

(21 marks) **Investigation 1.B: Weave Your Own Food Web**

- Answer Procedure question 7. (Use a word-processing program or a drawing program to complete this question. You may also wish to draw and scan your food web.)

(3 marks) 7.

- Answer Analysis questions 1 to 4.

(2 marks) 1.

(5 marks) 2.

(4 marks) 3.

(3 marks) 4.

(4 marks)

- Answer Extension question 5.

(21 marks) **Discuss**

Use information from the activity in Reflect and Connect, and from any other activity that you completed, to respond to the following question: Should vegetarianism be encouraged in Canada? Identify the benefits/risks of the Canadian population adopting total vegetarianism.

Remember that you will be marked by a rubric (guide) which you can access in Lesson 2.

MODULE 1: LESSON 3 ASSIGNMENT

This Module 1: Lesson 3 Assignment is worth 42 marks. The value of each assignment and each question is stated in the left margin.

(42 marks) Lesson 3 Assignment: Two Hydrogens and an Oxygen: One Small Molecule, One BIG Role

(26 marks) Lesson 3 Lab: Assessing Water Quality

This lab will allow you to find out how harmful elements can enter an ecosystem through the water cycle. You will examine the source of acid rain and its effect on populations within an ecosystem.

Problem

Can water quality be assessed by studying the effects of acid rain on different populations of aquatic invertebrates?

Materials

McGraw-Hill Virtual Laboratory—Assessing Water Quality

Procedure

Read and follow the procedures in the virtual laboratory.

(2 marks) Observations

Explain what happened as the acidity of the water increased.

(4 marks)

Data

Create two data tables like the ones in the lab with which you gathered your data. You may take a screen capture of the tables and graphs from the virtual lab. Remember that you should have two data tables, since you were asked to repeat the experiment at the end of the procedure. You will also create or copy and paste the graphs that resulted from your data tables.

(17 marks) **Questions**

Answer the five virtual lab journal questions here. The “Journal” icon will be located at the bottom of the web page and looks like a notebook. Copy and paste the questions from the virtual lab journal section, and write your response here. Answer in complete sentences, and give a well-thought-out answer.

(3 marks) 1.

(3 marks) 2.

(4 marks) 3.

(5 marks) 4.

(2 marks) 5.

(3 marks) **Conclusions**

Answer the question posed in the problem at the beginning of the lab. Explain how assessing water quality of aquatic environments can be used to determine the effects of acid rain.

(16 marks) **Lesson 3 Lab: Societal Uses of Water**

You will be marked on your presentation of findings and your answers to "Opinions and Recommendations" on page 41 of your textbook.

You will be presenting your findings on your choice of societal uses of water. You could use one of the following methods: a podcast that may contain a radio/television interview; a game show; a web quest; or any other form of presentation that has been pre-approved by your teacher.

Post your presentation to the discussion area.

Work as a group to complete the "Opinions and Recommendations" portion for the investigation. Ensure your team member names are listed on the submission to your teacher. Each team member should save a copy of the group work in his or her course folder.

A rubric is provided here to show you how you will be marked on your presentation, opinions, and recommendations. Each question is worth a maximum of four marks.

Group Project: Societal Uses of Water

CATEGORY	4	3	2	1
Content	The topic is extensively covered with explicit reference to details and examples. The subject knowledge is thorough and well supported.	Essential knowledge is included about the topic and is accompanied by relevant details and examples. The subject knowledge is extensive but may not be well supported.	Essential information is included about the topic with some reference made to relevant details and/or examples. The response may contain minor errors or omissions.	The response lacks necessary factual information and support of details. Relevant examples of aspects may be identified, but they are not connected and may not be relevant to the topic.

Sources	A wide range of sources of information was consulted. Suitable material was selected to support the response. Sources of information were appropriately referenced.	Multiple sources of information were consulted. Suitable material was selected that supports the response. Sources of information were appropriately referenced.	More than one source of information was consulted. The response demonstrates that an attempt was made to identify suitable material that supports the response. Sources of information were acknowledged.	Only one source of information was consulted. The response demonstrates a poor attempt to select suitable supporting material. Sources of information may not be acknowledged.
Workload **(Student-based assessment)**	The workload is divided and shared equally by all team members.	The workload is divided and shared fairly by all team members, though workloads may vary from person to person.	The workload is divided, but one person in the group is viewed as not doing his or her fair share of the work.	The workload was not divided or several people in the group are viewed as not doing their fair share of the work.
Opinions and Recommendations	Student responses were well thought out and contain insightful opinions and plausible recommendations. The conclusions show an in-depth and thorough understanding of the relationship between water usage and its impact on the overall water quality and economic role of water in society.	Student responses were well thought out and contain well-thought-out opinions and recommendations. The conclusions show a detailed understanding of the relationship between water usage and its impact on the overall water quality and economic role of water in society.	Student responses contain logical opinions and recommendations. The conclusions show an adequate understanding of the relationship between water usage and its impact on the overall water quality and economic role of water in society.	Student responses demonstrate reasonable opinions and recommendations, but they may not be supported by relevant scientific facts. The conclusions show a poor understanding of the relationship between water usage and its impact on the overall water quality and economic role of water in society.

Opinions and Recommendations

1.

2.

3.

4. a.

4. b.

MODULE 1: LESSON 4 ASSIGNMENT

This Module 1: Lesson 4 Assignment is worth 45 marks. The value of each assignment and each question is stated in the left margin.

(45 marks) Lesson 4 Assignment: Cycling of Matter

(5 marks) **TR 1.** Sketch a unified diagram that identifies processes common to both the carbon cycle and the oxygen cycle. Identify the key forms in which carbon and oxygen will occur within both the oxygen cycle and the carbon cycle.

(10 marks) **TR 2.** Draw a unified diagram that illustrates how carbon, oxygen, nitrogen, and phosphorus cycle together through the biosphere.

(30 marks) **Lesson 4 Lab: Interdependence of Plants and Animals**

When you are logged into the virtual lab, you can print off the “Exploration Guide.” Put your answers to the questions in the Exploration Guide below. You can copy and paste the components that you need from this guide.

(2 marks) 1. a.

(2 marks) 1. b.

(2 marks) 1. c.

(8 marks) 1. d.

(2 marks) 2. a.

(2 marks) 2. b.

(1 mark) 2. c.

(4 marks) 3. a.

(3 marks) 3. b.

(4 marks) 3. c.

MODULE 1: LESSON 5 ASSIGNMENT

This Module 1: Lesson 5 Assignment is worth 25 marks. The value of each assignment and each question is stated in the left margin.

(25 marks) Lesson 5 Assignment: Biodiversity and Biomagnification

(14 marks) **TR 1.** Complete questions 1 to 5 on page 28 of your textbook.

(3 marks) 1.

(3 marks) 2.

(2 marks) 3.

(2 marks) 4.

(4 marks) 5.

(4 marks) **TR 2.** How does the cycling of a harmful element compare to a biogeochemical cycle?

(4 marks)

Reflect and Connect

Why should you learn about the connections between biodiversity, energy flow, biomagnification, and the cycling of matter? You can record your response using graphics, text, or multimedia. Make sure you support your reasons with examples.

(3 marks)

Reflect on the Big Picture

What can biodiversity and biomagnification tell you about the biosphere's state of equilibrium?

Once you have completed all of the questions, submit your work to your teacher.

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